

Original Article

STUDY ON PREVALENCE OF UTI AND GLYCEMIC STATUS IN ANTE NATAL WOMEN AT OUR TERTIARY CARE HOSPITAL

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Abstract

Introduction: Gestational diabetes mellitus (GDM) commonly appears between the second and third trimesters of pregnancy as a result of hormonal changes that induce a transitory state of insulin resistance (IR) in the mother, allowing a greater supply of glucose to the fetus. Urinary tract infections (UTI) continue to be one of the most common medical conditions complicating pregnancy, with a prevalence of approximately 20%. A UTI is diagnosed when there is an overgrowth of bacteria in the urinary tract ($\geq 10^5$ counts/mL of urine), irrespective of the presence of clinical symptoms

Aim and Objectives: to measure the Serum levels of two-hour blood glucose (post 75 gm glucose tolerance test) and find out the prevalence of UTI in gestational diabetes mellitus.

Materials and Methods: Basic hematological and biochemical investigations were carried. All the patients were subjected to first trimester ultrasound scan to confirm gestational age less than 12 weeks. After general and gynecological examination, two-hour blood samples were collected for 75 g OGTT, the values are interpreted as per DIPSI guidelines (GDM is diagnosed if 2 hour PPBS is >140 mg/dL). Clean-catch midstream urine was collected from each pregnant woman into a wide-mouthed sterile screw-capped container. With a Calibrated micro-loop 0.001 ml. of urine charged into appropriate culture media. After overnight incubation at 37°C for 24 hours, colony counts yielding bacterial growth of $\geq 10^5$ / ml was taken as being significant in both symptomatic and asymptomatic pregnant women.

Results: In the present study, we included 400 antenatal women based on inclusion and exclusion criteria. We found the prevalence of 6.5% GDM in pregnant women. We further evaluated all the antenatal women for urinary tract infections with and without symptoms of UTI. We found the prevalence of 12% women with UTI and 88% without UTI. We evaluated the prevalence of UTI in relation to gestational trimester, we found prevalence of 13%, 10% and 13% in first, second and third trimester respectively.

Discussion and Conclusion: UTI affects premature labour directly through development of amnionitis. Bacterial enzymes such as collagenase may weaken the fetal membrane. The commonest maternal morbidity was preterm labour and fetal morbidity was LBW. Pregnant women with UTI are at an increased risk for adverse maternal and fetal outcomes which could be prevented by antimicrobial treatment. Hence pregnant women should be screened for bacteriuria and treated if results are positive. Public educational programmes on the importance of personal hygiene and good environmental sanitation habits mostly during pregnancy should be carried out as a part of routine

antenatal care. Our study emphasizes the importance of routine screening for ASB in pregnancy rather than screening only those women with symptoms. This approach would help identify high-risk women at significant risk for preterm delivery, allowing targeted care and proper use of available resources. On the other hand, widespread injudicious use of antibiotics and the subsequent development of antibiotic resistance are growing concerns. Therefore, health care teams should consider regular reviews of antibiograms and choose the appropriate antibiotic in each case.

Keywords: pregnancy, gestational diabetes mellitus, urinary tract infections, glucose tolerance test.

INTRODUCTION:

Gestational diabetes mellitus (GDM) commonly appears between the second and third trimesters of pregnancy as a result of hormonal changes that induce a transitory state of insulin resistance (IR) in the mother, allowing a greater supply of glucose to the fetus. After GDM, thyroid disease is the most common endocrine disorder in obstetrics, with an incidence of 5-10%. Some studies speak of the existence of a relationship between diabetes and thyroid disorders but the results remain controversial, limiting the analysis of the effects that both diseases could have on the development of pregnancy. The prevalence of GDM varies as high as 17.5% as per the reports of International Association of Diabetes in Pregnancy Study Groups (IADPSG) [1,2].

Urinary tract infections (UTI) continue to be one of the most common medical conditions complicating pregnancy, with a prevalence of approximately 20% [3]. A UTI is diagnosed when there is an overgrowth of bacteria in the urinary tract ($\geq 10^5$ counts/mL of urine), irrespective of the presence of clinical symptoms [4]. UTI include a spectrum of disorders, ranging from those affecting the lower urinary tract, like asymptomatic bacteriuria (ASB) and cystitis, to those affecting the kidney, such as pyelonephritis. The prevalence of ASB is 2% to 10% of cases [5]. Clinical trials in the 1960s and 1970s reported that untreated ASB had a 20% to 30% risk of progressing into pyelonephritis. Early diagnosis and adequate treatment with antibiotics helped reduce the risk by 80% [6].

Organisms causing UTI in women (whether pregnant or not) are of the same species and virulence factors. Bacteria commonly isolated include *Escherichia coli*, *Klebsiella pneumoniae*, *Proteus*, *Acinetobacter*, *Staphylococcus saprophyticus*, Group B *Streptococcus* (GBS), and *Pseudomonas aeruginosa* [7-9].

The incidence of hypothyroidism in pregnancy is higher in Asian countries, with more observed in the Indian population being attributed to nutritional as well as immunological origins. Even subclinical hypothyroidism (SCH) with high thyroid-stimulating hormone (TSH) and a normal thyroxine level is commonly associated with endocrine abnormalities in pregnancy [15-19]. Anti-thyroperoxidase (anti-TPO) antibody having the ability to cross the placenta has been suggested to affect fetal growth [20,21]. Euthyroid pregnant women with high anti-TPO antibody titers have been registered with several adversities in obstetric and fetal outcomes [22-24].

Gestational diabetes mellitus (GDM) is a frequent occurrence in the second trimester of pregnancy, with the risk being greater with increasing age [25-27]. Autoimmune diseases like insulin-dependent diabetes mellitus (IDDM), Hashimoto's thyroiditis, pernicious anemia, etc., are more common in women and occur concomitantly. An association between hypothyroidism and different types of diabetes mellitus has been reported previously.

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AIM AND OBJECTIVES:

- 1) To measure the Serum levels of two-hour blood glucose (post 75 gm glucose load), in antenatal women.
- 2) To find out the prevalence of Gestational Diabetes and urinary tract infections in ante-natal women attending ante natal clinic.

MATERIALS AND METHODS:

This cross-sectional study was conducted in the Department of Obstetrics and Gynecology, at our tertiary care hospital.

Study design: Prospective hospital based study.

Sample size: 400 cases of antenatal mothers were included.

Inclusion Criteria: Apparently healthy pregnant women, both primigravida and multi-gravida, with singleton pregnancies were included and written informed consent were obtained from the enrolled cases. We randomly included all the antenatal mothers presenting with or without symptoms of UTI.

Exclusion Criteria: Pregnant women with pre-existing diabetes, on any hormone replacement therapy, any other metabolic or chronic disorders, and bad obstetric history, history of antibiotic therapy for UTI and mothers who are at risk of UTI due to secondary causes like stones and sickle cell disease were excluded from the study.

Data collection: Detailed history was taken regarding the symptoms of thyroid disorders, menstrual history, obstetric history, past medical history, family history, personal and social history. General examination was done. Body temperature, pulse rate, blood pressure, respiratory rate was noted. Systemic examination of the cardiovascular system (CVS), central nervous system (CNS), respiratory system and thyroid gland was done.

Blood Sample Collection and Biochemical Investigations: Basic hematological and biochemical investigations were carried. All the patients were subjected to first trimester ultrasound scan to confirm gestational age less than 12 weeks. After general and gynecological examination, two-hour blood samples were collected for 75 g OGTT, the values are interpreted as per DIPSII guidelines (GDM is diagnosed if 2 hour PPBS is >140 mg/dL). Clean-catch midstream urine was collected from each pregnant woman into a wide-mouthed sterile screw-capped container. With a Calibrated micro-loop 0.001 ml. of urine charged into appropriate culture media. After overnight incubation at

37°C for 24 hours, colony counts yielding bacterial growth of $\geq 10^5$ / ml was taken as being significant in both symptomatic and asymptomatic pregnant women.

This cross-sectional study was conducted in the Department of Biochemistry, in collaboration with the Department of Obstetrics and Gynecology, and 382 eligible pregnant women coming for their first antenatal checkup (ANC) were enrolled in the study.

Apparently healthy pregnant women, both primigravida and multi-gravida, with singleton pregnancies in their first ANC were included and written informed consent was obtained from the enrolled cases. Pregnant women with preexisting thyroid diseases or any other endocrine disorders, pre-existing diabetes, on any hormone replacement therapy, any other metabolic or chronic disorders, and bad obstetric history with a known cause were excluded from the study.

After general and gynecological examination, fasting, one-hour, and two-hour blood samples were collected for 75 g OGTT and estimation of thyroid profile (TSH, fT4, anti-TPO antibody). The biochemical parameters were performed on the Beckman Coulter AU5A00 auto analyzer with commercially available kits. Thyroid profiles were done by the chemiluminescence method in an Siemens Advia Centaur automated Immunoassay analyzer.

For this study, the trimester-specific upper limit value for TSH was taken as <2.5 mIU/mL for the first trimester and <3 mIU/mL for the second and third trimesters as per American Thyroid Association (ATA) 2011 criteria. Patients with TSH levels higher than the trimester specific level and normal fT4 levels were diagnosed with SCH. Anti-TPO level <60 U/L was taken as normal upper limit as per manufacturer's protocol.

Level more than 60U/L is considered a raised anti-TPO titer.

GDM was diagnosed using 75 g of glucose challenge test (GCT) with a fasting value of more than 92 mg/dl, a one-hour post-glucose value of more than 180 mg/dl, and a two-hour post-glucose value of more than 153 mg/d

RESULTS:

This cross-sectional observational study was conducted in the Department of Obstetrics and Gynecology at our hospital. A total of 400 eligible pregnant women coming for their first antenatal checkup (ANC) were enrolled in the study.

Table 1: Shows baseline characteristics of the study patients	
Parameters	Mean \pm SD
Age	28.60 \pm 3.64
Gestational age	14.56 \pm 9.68
2-hour Glucose	107.12 \pm 21.76

Table 2: Shows number of patients with GDM		
Parameters	Number of patients	Percentage
Total number of patients	400	100%
Number of women with GDM	26	6.5%
Number of women without GDM	372	93.5 %

Table 3: Shows number of patients with and without UTI		
Parameters	Number of patients	Percentage

Total number of patients	400	100%
Number of women with UTI	48	12%
Number of women without UTI	352	88%

DISCUSSION:

In the present study, we included 400 antenatal women based on inclusion and exclusion criteria. We found the prevalence of 6.5% GDM in pregnant women. We further evaluated all the antenatal women for urinary tract infections with and without symptoms of UTI. We found the prevalence of 12% women with UTI and 88% without UTI.

A meta-analysis published by Romero et al. concluded that non-bacteriuric patients had only approximately two-thirds the risk of LBW and half the risk of preterm delivery compared to those with untreated symptomatic bacteriuria, and antibiotic treatment reduced the risk of LBW [10]. A study conducted by Smaill et al., who noted that antibiotic treatment for ASB reduced the risk of pyelonephritis (relative risk [RR], 0.23; 95% CI, 0.13 to 0.41) and LBW (RR, 0.66; 95% CI, 0.49 to 0.89), although no significant reduction in the rates of preterm birth was demonstrated [11]. Several studies have shown *E. coli* and other Gram-negative isolates (namely the *Klebsiella* species, *Acinetobacter baumannii*, and *Proteus mirabilis*) to be responsible for 70% to 80% of UTI in pregnancy. Gram-positive organisms (e.g., *Enterococcus faecalis* and GBS) were isolated in approximately 10% of UTIs in pregnant women [12, 13]. The identification of *E. coli* as the most common bacteria responsible for recurrent UTI, particularly relapse, could be explained by the increased susceptibility to vaginal colonization by the adjacent rectal flora and the inherent affinity for uropathogenic coliforms to adhere to uroepithelial cells. In our study we found the common isolate being *E. coli*. Urinary tract infections are one of the common infections occurring during pregnancy. The intent of present study is to determine the prevalence of urinary tract infection in pregnancy. Urinary tract infections are common complications of pregnancy. Therefore, proper screening and treatment of urinary tract infections during pregnancy is necessary to prevent complications. All pregnant women should therefore be screened for the presence of bacteriuria, which if detected should be treated with an antimicrobial agent believed to be safe for use in pregnancy.

CONCLUSION:

UTI affects premature labour directly through development of amnionitis. Bacterial enzymes such as collagenase may weaken the fetal membrane. The commonest maternal morbidity was preterm labour and fetal morbidity was LBW. Pregnant women with UTI are at an increased risk for adverse maternal and fetal outcomes which could be prevented by antimicrobial treatment. Hence pregnant women should be screened for bacteriuria and treated if results are positive. Public educational programmes on the importance of personal hygiene and good environmental sanitation habits mostly during pregnancy should be carried out as a part of routine antenatal care. Our study emphasizes the importance of routine screening for ASB in pregnancy rather than screening only those women with symptoms. This approach would help identify high-risk women at significant risk for preterm delivery, allowing targeted care and proper use of available resources. On the other hand, widespread injudicious use of antibiotics and the subsequent development of antibiotic resistance are growing concerns. Therefore, health care teams should consider regular reviews of antibiograms and choose the appropriate antibiotic in each case.

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